CURRICULUM VITAE

Julie DEMARGNE

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PROFILE

Research scientist with expertise in uncertainty modeling and propagation, hydrologic modeling, forecast verification, statistical analysis, ensemble prediction, operational hydrologic forecasting, remote sensing, and geographic information sciences

EDUCATION

Ph.D. Geographic Information Sciences, University of Marne-la-Vallée, France, June 2001
Dissertation: Quality of Digital Terrain Models in hydrology, application to watershed flood regime characterization

M.S. Geographic Information Sciences, University of Marne-la-Vallée, France, Sept. 1997
Thesis: Methodology for mapping the available accuracy of various parameters extracted from a Digital Terrain Model

B.S. Mathematics, University of Orléans, France, July 1996

PROFESSIONAL EXPERIENCE

2001-present: Office of Hydrologic Development (OHD), NOAA National Weather Service (NWS), Silver Spring, Maryland

UCAR Project Scientist III - October 2010 to present

- Lead the Hydrologic Ensemble Prediction (HEP) group of the NWS Office of Hydrologic Development in the Hydrologic Science and Modelling Branch, including:
  - Plan and lead the research, development, and research-to-operations activities of the HEP group to develop hydrologic ensemble prediction and data assimilation capabilities in support of operational hydrologic forecasting in the River Forecast Centers (RFC) and Weather Forecast Offices (WFO) of the NOAA/NWS. By reducing and accounting for all major sources of uncertainty in the forecasting system, the main goal is to provide probabilistic forecast and verification products for better-informed decision making in water resources planning and management and risk mitigation for droughts and floods.
  - Coordinate activities with other groups in the OHD and forecasters at the RFCs for development and testing of the eXperimental Ensemble Forecast System (http://www.weather.gov/oh/XEFS/), its transition to the operational Hydrologic Ensemble Prediction Services within the Community Hydrologic Prediction System

(CHPS), as well as development of the NOAA's multi-agency Integrated Water Resources Science and Services.
  - Contribute to OHD budgeting, project reporting (e.g., for the Advanced Hydrologic Prediction Service), proposal development (e.g., for the NOAA's Climate Program Office), and performance review.
  - Develop collaborative R&D activities within the NWS (e.g., National Centers for Environmental Prediction (NCEP)) and with external partners (e.g., Deltares, Hydrologic Ensemble Prediction Experiment (HEPEX)). Support ensemble and data assimilation training activities (e.g., sessions and workshop, COMET training modules).

UCAR Project Scientist I - November 2004 to September 2010

- Served as the national verification program focal point at OHD, where my role was to:
  - Lead the NWS Hydrologic Forecast Verification Team (including all 13 River Forecast Centers) to propose and evaluate standardized verification strategies.
  - Plan, lead and contribute to the research, development, research-to-operations, and training activities in OHD and with partners (e.g., Univ. of Iowa, Deltares, COMET) to develop an integrated verification system for the Community Hydrologic Prediction System; organized 2 verification workshops and contributed to COMET verification training modules.
  - Support collaborative verification activities within the NWS (e.g., NWS National Performance Management Committee) and with external partners (e.g., HEPEX verification test bed participants).
- Planned, co-led, and contributed to the research, development, and research-to-operations transition of the ensemble prediction and data assimilation techniques and methodologies as part of the HEP group, including:
  - Lead the development of the ensemble hindcasting system and its implementation at the RFCs to support large-sample verification and uncertainty analysis.
  - Contribute to the development of the eXperimental Ensemble Forecast System components, their integration into CHPS and experimental implementation at the RFCs; support ensemble training activities.
  - Support collaborative activities within the NWS (e.g., NCEP EMC and CPC, ESRL) and with external partners, including the THORPEX-HYDRO Project and OHD-NCEP Core Project funded by the Climate Prediction Program for the Americas.
  - Develop proposals: submitted 2 proposals (as lead-PI and co-PI) for the NOAA's Climate Program Office for collaborating with NCEP and selected RFCs over the next 3 years.

UCAR Visiting Scientist - July 2001 to October 2004

- Co-led the ensemble forecast end-to-end project as part of the Special Studies group:
  - Planned and coordinated the R&D and research-to-operations ensemble activities at OHD to support short- to long-term hydrologic ensemble prediction.
  - Enhanced the atmospheric ensemble pre-processor prototype and evaluated its performance through hindcasting and large-sample verification.
  - Supported the implementation and experimental operation of the atmospheric ensemble pre-processor prototype at 3 RFCs, and RFC training on ensemble prediction.
- Carried out R&D of probabilistic flood mapping and GIS applications as part of the River Mechanics group:

- Developed a geospatial method using the Ensemble Streamflow Prediction system and the FLDWAV hydraulic model to derive probabilistic flood maps while maintaining the hydraulic forecast information along the river system.
- Supported the enhancements of the FLDVIEW GIS application to generate deterministic and probabilistic flood forecast maps from hydraulic ensemble forecasts and the development of a GIS cross section tool for hydraulic model calibration.

1996-2001: Cemagref-Engref Remote Sensing Laboratory, Montpellier, France

Ph.D. Researcher - October 1997 to June 2001

- Completed my Ph.D. research on the quality of digital terrain models (DTMs) for hydrology applications, with a focus application on watershed flood regime characterization.
- Performed research on the use of satellite-derived terrain data for flood modeling and risk mapping on the Moselle River, under the "New Opportunities for Altimetry in Hydrology" project funded by the European Commission.
- Trained post-graduate engineers on remote sensing and GIS for hydrological and environmental applications.

Research Assistant - April to September 1997

- Defined and implemented a method for assessing the accuracy of various geomorphologic parameters extracted from airborne and satellite derived DTMs using ArcInfo GIS.

COMPUTING SKILLS

- Programming languages: Fortran, C, C++, Visual Basic, shell scripting
- GIS and image processing: Idrisi, ArcInfo, ArcView, ArcGIS, ERDAS Imagine
- Statistic software: Statistica, Matlab, R
- Operating systems: Windows, Unix, Linux

OTHER SKILLS AND COMPETENCIES

- Reviewer for: Journal of Hydrology, Journal of Hydrometeorology, International Journal of Geographical Information Science, IAHS Redbooks, Advances in Geosciences
- Member of American Geophysical Union (AGU) since 2003
- Member of Tip Top NOAA Toastmasters since October 2007; board officer from July 2008 to June 2010
- Bilingual: English and French; basic knowledge of Spanish

PUBLICATIONS AND PRESENTATIONS

Articles in Peer-Reviewed Journal

Demargne J., Brown J.D., Liu Y., Seo D-J., Wu L., Toth Z., and Zhu Y. (2010) Diagnostic verification of hydrometeorological and hydrologic ensembles. *Atmospheric Science Letters*, 11 (2), 114-122.

Brown J.D., **Demargne J.**, Seo D-J., and Liu Y. (2010) The Ensemble Verification System (EVS): a software tool for verifying ensemble forecasts of hydrometeorological and hydrologic variables at discrete locations. *Environmental Modelling and Software*, 25(7), 854-872.

Demargne J., Mullusky M., Werner K., Adams T., Lindsey S., Schwein N., Marosi W., and Welles, E. (2009) Application of forecast verification science to operational river forecasting in the U.S. National Weather Service. *Bulletin of the American Meteorological Society*, 90(6), 779-784.

Wu L., Seo D-J., **Demargne J.**, Brown J., Cong S., and Schaake J. (2010) Generation of ensemble precipitation forecast from single-valued quantitative precipitation forecast via meta-Gaussian distribution models. Accepted for publication in *Journal of Hydrology*.

Liu Y., Brown J.D., **Demargne J.**, and Seo D-J. (2010) A wavelet-based approach to assessing timing errors in hydrologic predictions. Accepted for publication in *Journal of Hydrology*.

Demargne J., Wu L., Seo D-J., and Schaake J. (2007) Experimental hydrometeorological and hydrologic ensemble forecasts and their verification in the U.S. National Weather Service, in Quantification and reduction of predictive uncertainty for sustainable water resources management (Proceedings of Symposium HS2004 held at IUGG2007, Perugia, July 2007). *IAHS Publications Series (Red Books)*, 313, 177-187.

Schaake J., **Demargne J**., Hartman R., Mullusky M., Welles E., Wu L., Herr H., Fan X., and Seo D-J. (2007) Precipitation and temperature ensemble forecasts from single-valued forecasts, *Hydrology and Earth Systems Sciences Discussions*, 4, 655-717.

Charleux-Demargne J., and Puech C. (2000) Qualité des MNT utilisés en hydrologie: méthode de diagnostic de la qualité d'extraction du réseau hydrographique et des limites de bassins versants à partir d'un MNT. *Revue Internationale de Géomatique,* 10, 3-4/2000, 335-357.

Conference Papers and Presentations

Demargne J., Liu Y., Brown J.D., Seo D-J., Wu L., Weerts A., and Werner M. (2010). Hydrologic ensemble hindcasting and verification in the U.S. National Weather Service. Presentation at *European Geosciences Union (EGU) General Assembly 2010*, May 3-7, 2010, Vienna, Austria.

Seo D-J., **Demargne J.**, Wu L., Liu Y., Brown J.D., Regonda S., and Lee H. (2010) Hydrologic ensemble prediction for risk-based water resources management and hazard mitigation. Paper presented at *Joint Federal Interagency Conference on Sedimentation and Hydrologic Modeling (JFIC2010)*, June 27 – July 1, 2010, Las Vegas, Nevada.

Demargne J., Brown J.D., Liu Y., and Seo D-J. (2009) Application of forecast verification science to operational river forecasting in the National Weather Service. Invited contribution at *Eleventh Northeast Regional Operational Workshop (NROW)*, November 4-5, 2009, Albany, NY.

Demargne J., Franz K., Fortin V., Pappenberger F., and Perreault L. (2009) HEPEX verification test bed. Presentation at *HEPEX workshop on post-processing and downscaling of atmospheric ensemble forecasts for hydrologic applications*, June 15-18, 2009, Toulouse, France.

Toth Z., Schultz P., Mullen S., **Demargne J.**, and Zhu Y. (2007) Completing the forecast: assessing and communicating forecast uncertainty. Paper presented at *ECMWF Workshop on Ensemble Prediction*, 7-9 November 2007, Reading, U.K., 36pp.

Demargne J., Seo D-J., Wu L., Schaake J., and Brown J.D. (2007) Verifying hydrologic forecasts in the U.S. National Weather Service. Presentation at *Third international verification methods workshop*, January 29-February 2, 2007, Reading, U.K.

Demargne J., Cong S., Wu L., and Seo D-J. (2006) Verification of experimental hydrometeorological and hydrological ensemble forecasts in the U.S. National Weather Service. Presentation at *2006 Joint Assembly*, May 23-26, 2006, Baltimore, MD.

Schaake J., Restrepo P., Seo D-J., **Demargne J.**, Wu L., and Perica S. (2005) Hydrological ensemble prediction: challenges and opportunities. Paper presented at *International conference on innovation advances and implementation of flood forecasting technology*, October 17-19, 2005, Tromsø, Norway.

Demargne J., Schaake J., Wu L., Welles E., Herr H., and Seo D-J. (2005) Precipitation ensembles from single-value forecasts for hydrological ensemble forecasting. Presentation at *2005 Joint Assembly,* May 23-27, 2005, New Orleans, LA.

Demargne J., Mullusky M., Welles E., Herr H., Wu L., Fan X., and Schaake J. (2004) Producing and assessing short-term temperature ensembles for Ensemble Streamflow Prediction. Presentation at *2004 Joint Assembly,* May 17-21, 2004, Montreal, Canada.

Schaake J., Perica S., Mullusky M., **Demargne J.**, Welles E., and Wu L. (2004) Pre-processing of atmospheric forcing for Ensemble Streamflow Prediction. Paper presented at *84th AMS Annual Meeting*, 5.2, January 11-16, 2004, Seattle, WA.

Mullusky M., **Demargne J.**, Welles E., Wu L., and Schaake J. (2004) Hydrologic applications of short and medium range ensemble forecasts in the NWS Advanced Hydrologic Prediction Services (AHPS). Paper presented at *84th AMS Annual Meeting,* J11.5, January 11-16, 2004, Seattle, WA.

Charleux-Demargne J., and Puech C. (2000) Quality assessment for drainage networks and watershed boundaries extraction from a Digital Elevation Model (DEM). Paper and presentation at *8th ACM international symposium on advances in geographic information systems,* 89-94, November 10-11, 2000, Washington, DC.

Charleux J., Puech C., and Laurini R. (2000) Méthode de diagnostic de la qualité d'extraction du réseau hydrographique et des limites de bassins versants à partir d'un MNT. Presentation at *Journées de la Recherche SIG CASSINI 2000*, September 7-9, 2000, La Rochelle, France.

Bendjoudi H., Bois P., Breil P., **Charleux J.**, Galéa G., Grésillon J.M., Hubert P., Javelle P., Lang M., Leblois E., Lubes Niel H., Maniguet F., Oberlin G., Olivry J.C., Puech C., Ramez P., Ribstein P., Sauquet E., and Servat E. (2000) Régimes hydrologiques : des concepts et modèles adaptés au développement des connaissances. Paper presented at *Colloque PNRH 2000*, 45-50, Toulouse, May 16-17, 2000.

Charleux J., Javelle P., Puech C., Galéa G., and Grésillon J.M. (1999) Regionalization of hydrologic parameters using remotely sensed data. Presentation at *2nd Inter-Regional Conference on Environment-Water,* September 1-3, 1999, Lausanne, Switzerland.

Thesis and Reports

Carter G., Restrepo P., Kochendorfer J., Smith M., Reed S., Koren V., Cosgrove B., Kitzmiller D., Riley D., Miller D., Seo D-J., and **Demargne J**. (2010) Office of Hydrologic Development – Hydrology Laboratory strategic science plan. *Report of the Strategic Science Plan Team*, NOAA/National Weather Service, Office of Hydrologic Development, Silver Spring, U.S., 189p. [http://www.nws.noaa.gov/oh/src/docs/ Strategic_Sience_Plan2010.pdf]

Demargne J., Mullusky M., Lowe L., Coe J., Werner K., Alcorn B., Holts L., Takamoto A., Roth K., Marosi B., Philpott A., Meyer J., DeWeese M., Reckel H., Shedd R., Econopouly T., Intermill J., King S., Adams T., McGehee C., and Waller G. (2009) Towards standard verification strategies for operational hydrologic forecasting. *Report of the NWS Hydrologic Forecast Verification Team*, NOAA/National Weather Service, Office of Hydrologic Development, Silver Spring, U.S., 65p. [http://www.nws.noaa.gov/oh/rfcdev/docs/NWS-Hydrologic-Forecast-Verification-Team_Final-report_Sep09.pdf]

Gabrielsen P., **Demargne J**., Lawrence B., Lindsey S., Mullusky M., Page D., Schwein N., Staggs S., Adams T., Werner K., and Marosi B. (2006) National Weather Service river forecast verification plan. *Report of the Hydrologic Verification System Requirements Team*, NOAA/National Weather Service, Silver Spring, U.S., 44p. [http://www.nws.noaa.gov/oh/rfcdev/docs/Final_Verification_Report.pdf]

Demargne J. (2002) Flood forecast mapping: producing probabilistic water surface profiles and probabilistic flood maps. *R&D report*, NOAA/National Weather Service, Office of Hydrologic Development, Silver Spring, U.S., 53p.

Charleux-Demargne J. (2001) Quality of Digital Terrain Models in hydrology, application to watershed flood regime characterization. *Ph.D. Dissertation*, University of Marne-la-Vallée, France, 275p.

Charleux, J. (1997) Methodology for mapping the available accuracy of various parameters extracted from a Digital Terrain Model. *M.S. Thesis*, University of Marne-la-Vallée, France, 57p.